SPFit (SimPle fit or Spitz Fit)

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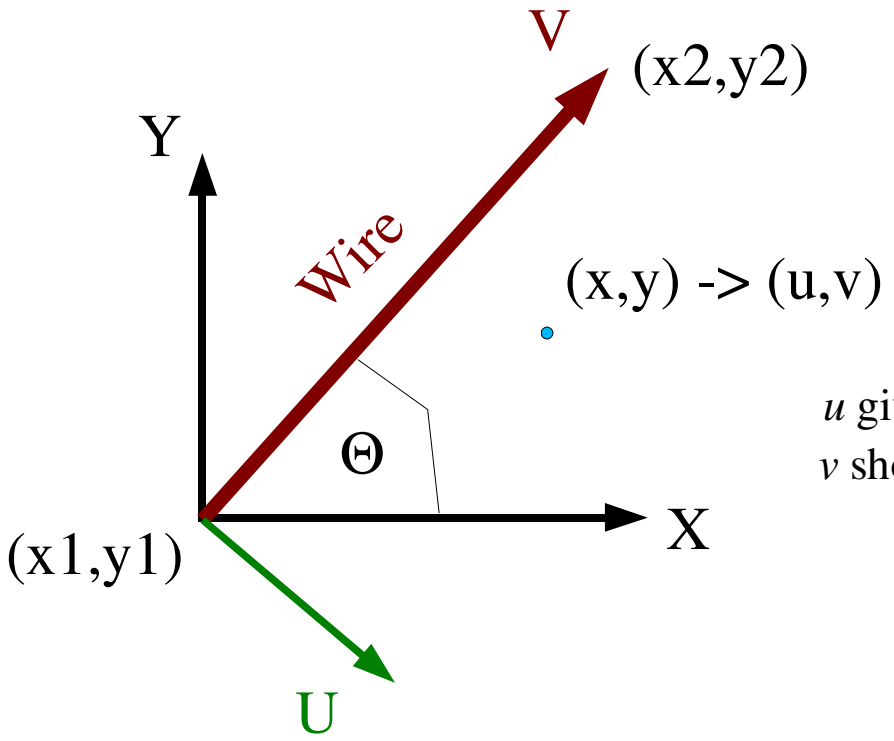
Basic idea:

[1] Take TPC tracks and hits associated with them as inputs
(classes TPCRTracks, TPCRHits from TPCRecoJP)
[2] Translate these to “CAVE” (aka World) coordinates
- Apply simple adjustments for ExB effects taken from polynomial fits to Jon's residual plots
[3] Uncertainties in TPC hit locations add these in quadrature:
- cluster size in x and y
- 30% of ExB correction made above
- 10% of drift distance along y to account for drift velocity
[4] First iteration:
Use TPCTrack data (position, direction, momentum) as seed.
Swim track using Swimmer “SwimMIPP” class to predict x,y locations along z
Minimize chi^2: (deltaX/sigmaX)**2 + (deltaY/sigmaY)**2
[5] Second iteration:
Use SwimMIPP track to predict x,y locations at DC's 1-3 (upstream of ROSY)
Add closest wire to track in each of the 4 planes if the distance is less than cut (10 cm currently)
Minimize chi^2 for TPC + wire hits
[6] Third iteration:
Like 5th, but add Chambers downstream of ROSY

Wire Chamber Geometry

Distances to wires calculated like this:



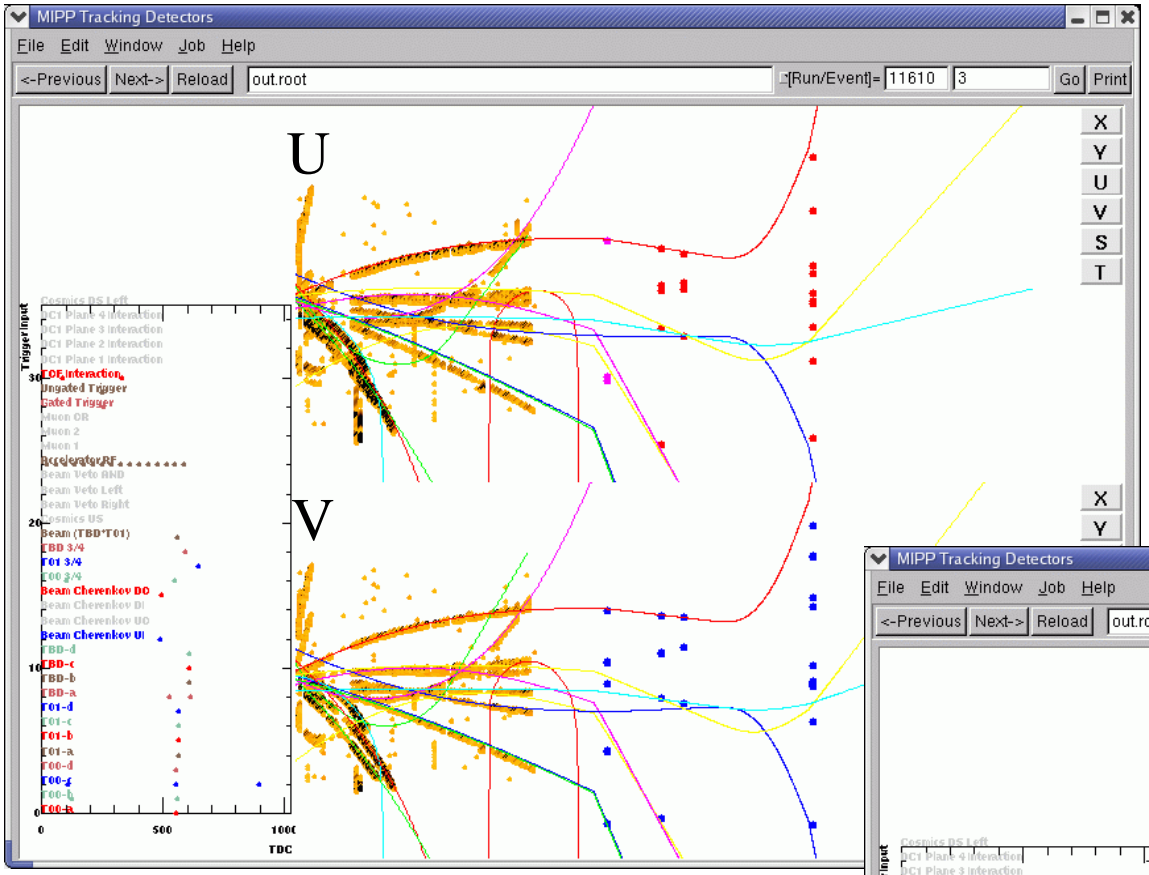
$$u = x \sin(\theta) - y \cos(\theta)$$
$$v = x \cos(\theta) + y \sin(\theta)$$

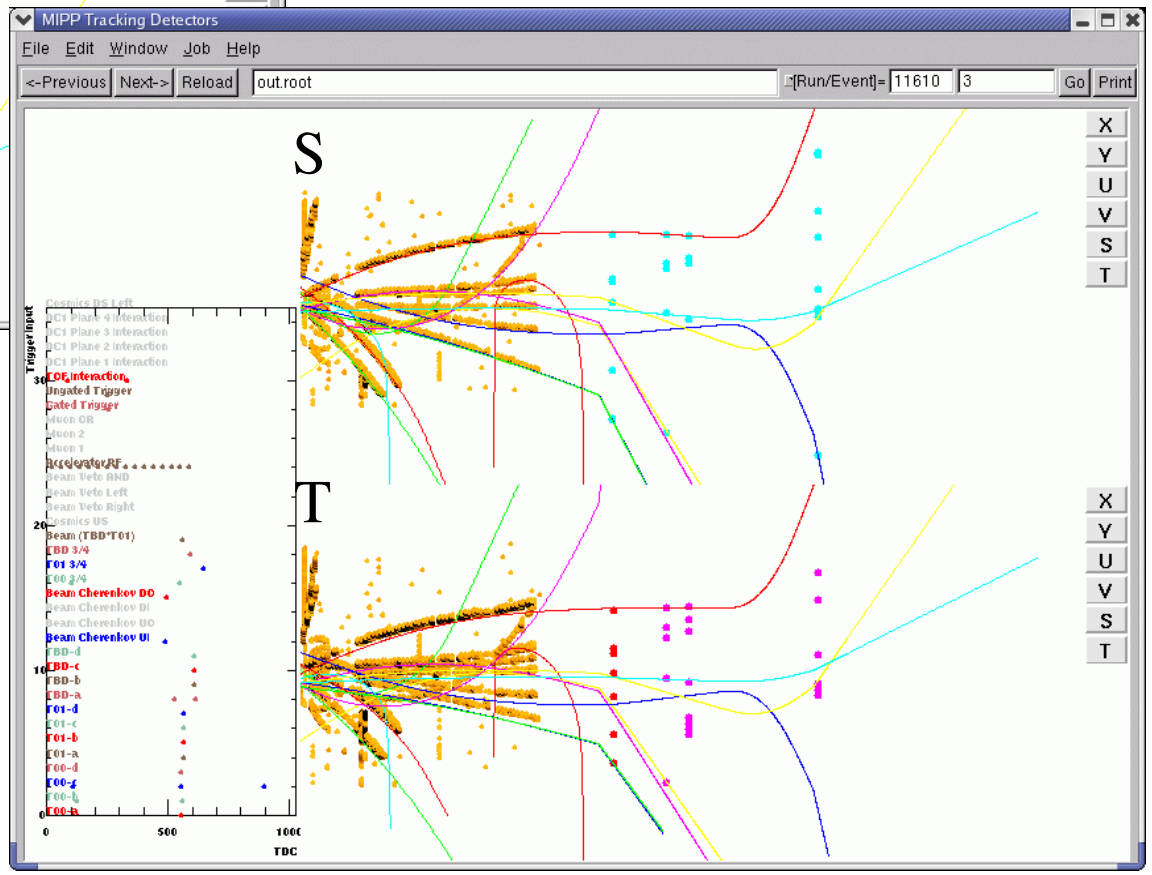
u gives (signed) distance to wire
v should always be between 0 and the wire length

DC planes 1 and 2 the U and V views
planes 3 and 4 the S and T views

To start tuning, working with 5 events from run 11610 (50 GeV on Bi)
Added new view (“Tracking Display”) to Event display which shows TPC and wire hits in x,y,u,v,s, and t projections.

Scale of z coordinate varies to make TPC big, ROSY and RICH small...

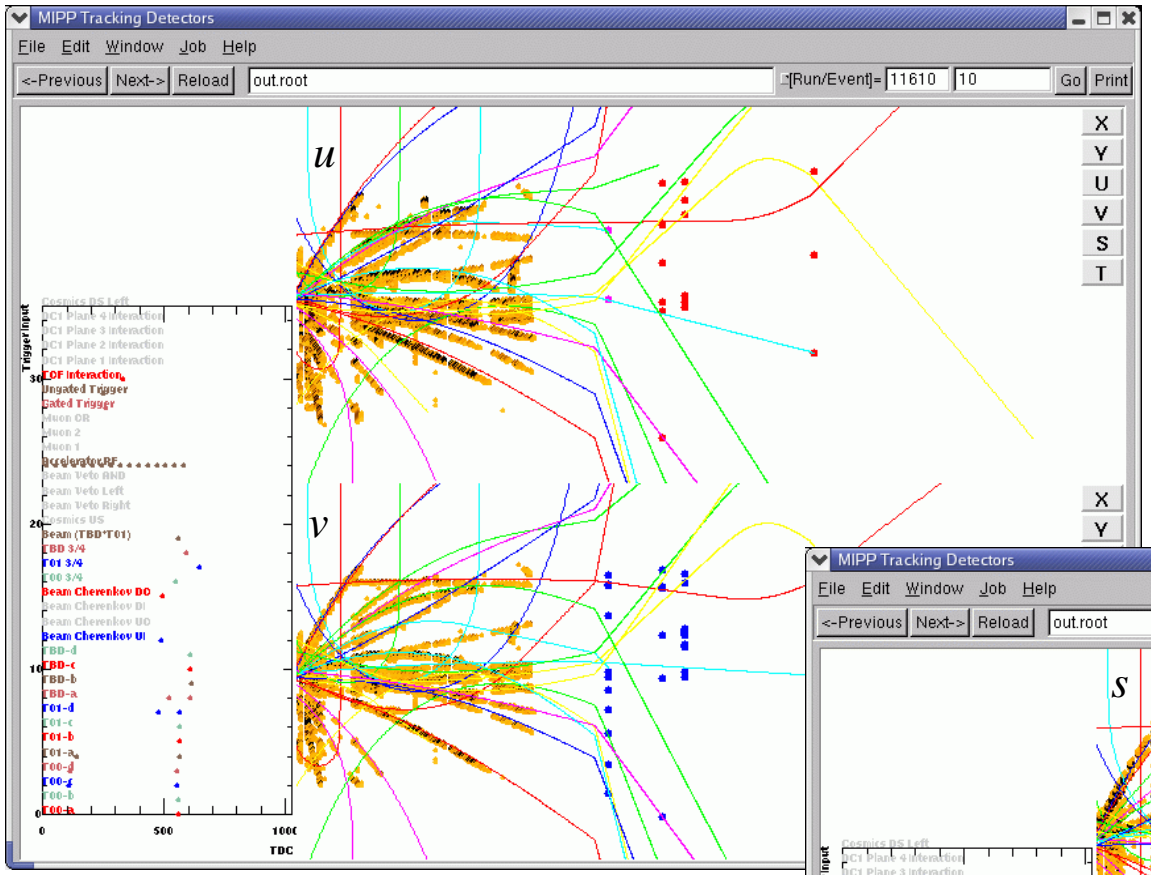


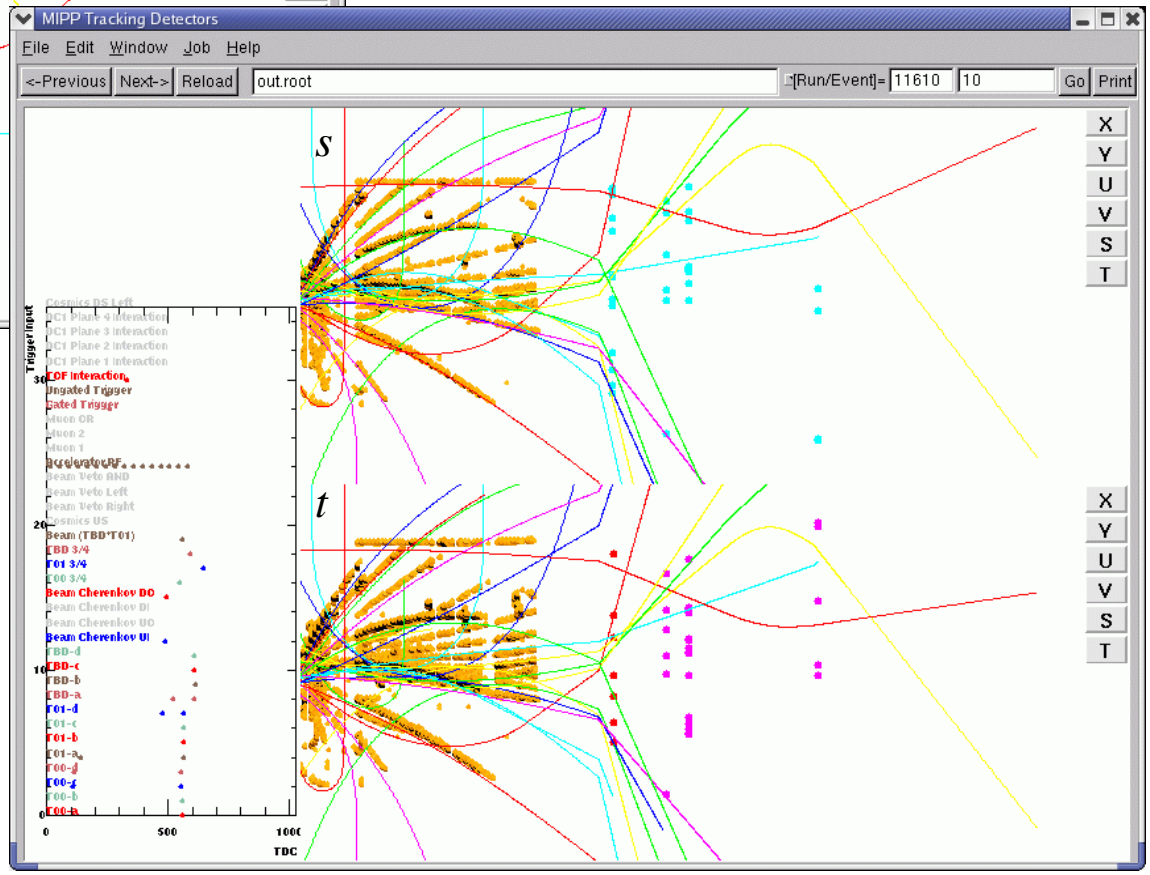


Run 11610, event 3

50 GeV on Bi

Fit to TPC + DC1-3





Run 11610, event 10

50 GeV on Bi

Fit to TPC + DC1-3

To Do List:

[1] Check events where TPC fit and my fits are way off
[2] Limit DC wires to some reasonable TDC window
[3] Remove “by hand” corrections to TPC geometry
[4] Add chambers 5-6
[5] Add final fit with constrained vertex
[6] Speed up
[7] Run lots of events and check chamber alignments